Listing of Claims

The listing of claims below will replace all prior versions and listings of claims in the application.

Claim 1. (Currently amended) A reconfigurable adaptive circuit matrix comprising:

at least one sheet of dielectric material;

a plurality of secondary electronic circuits arranged in a matrix and supported on or within each said dielectric material, one or more said secondary electronic circuits affected by at least one characteristic of said dielectric material;

an external switch ~~means~~ enabled by a magnetic field, a thermal field, or a vibration for electrically activating one or more of said secondary electronic circuits when said external switch ~~means~~ is activated; and

a means for varying said characteristic of said secondary electronic circuits to vary operation.

Claim 2. (Original) The reconfigurable adaptive circuit matrix of claim 1, wherein said dielectric material is a ferrotunable material.

Claim 3. (Original) The reconfigurable adaptive circuit matrix of claim 1, wherein one or more said secondary electronic circuits having a voltage adjustable device thereon.

Claim 4. (Original) The reconfigurable adaptive circuit matrix as in one of claims 1-3, wherein said secondary electronic circuits provide adaptation of radiation or reception characteristics of an electromagnetic coupling arrangement comprising at least one adjustable passive component.

Claim 5. (Original) The reconfigurable adaptive circuit matrix as in one of claims 1-3, wherein

said secondary electronic circuits provide a reconfigurable antenna and said dielectric layer has a non-conducting outer surface, said secondary electronic circuits comprising at least one adjustable passive component and mounted to an antenna substrate.

Claim 6. (Original) The reconfigurable adaptive circuit matrix as in one of claims 1-3, wherein said secondary electronic circuits provide a reconfigurable antenna and said dielectric layer has a non-conducting outer surface, said secondary electronic circuits comprising at least one adjustable passive component and at least one active component mounted to an antenna substrate.

Claim 7. (Currently amended) A reconfigurable adaptive circuit matrix comprising:

a plurality of conducting patches;

an electromagnetic coupler;

a plurality of conductive pathways; ~~and~~

a non-conducting surface arranged in a matrix, said conducting patches supported on said non-conducting surface and electrically interconnected via said pathways, said electromagnetic coupler having a resonant frequency adjusted by said conducting patches; and

an external matrix array of switches enabled by a magnetic field, a thermal field, or a vibration for electronically controlling at least one parameter of said reconfigurable adaptive circuit matrix.

Claim 8. (Original) The reconfigurable adaptive circuit matrix of claims 7, wherein said non-conducting surface is a first surface of a dielectric layer having a second surface supporting an electrically conductive layer.

Claim 9. (Original) The reconfigurable adaptive circuit matrix of claim 8, wherein said dielectric

layer comprises a plurality of layers of crystalline polymer.

Claim 10. (Original) The reconfigurable adaptive circuit matrix of claim 8, further comprising a plurality of active components discretely integrated onto said dielectric layer.

Claim 11. (Cancelled)

Claim 12. (Cancelled)

Claim 13. (Cancelled)

Claim 14. (Currently amended) A sheet-wise, bimorph composited structure comprising:

a ~~pair of spaced~~ first outer layers composed of an ultra, high-strain polymer ~~or an acrylic~~;

a first PVDF-TFE layer enabling a locally deformable structure, said first PVDF-TFE layer contacting said first outer layer;

a dielectric layer comprising a ferrotunable material ~~whose permittivity is dependent upon applied voltage~~ and having embedded therein a matrix circuit comprising a plurality of secondary circuits, said dielectric layer contacting said first PVDF-TFE layer opposite of said first outer layer;

~~a matrix circuit comprising a plurality of secondary circuits;~~

a non-conducting layer composed of a polymer sheet contacting said dielectric layer opposite of said first PVDF-TFE layer;

a layer having therein a control circuitry in a matrix arrangement providing an electromagnetic structure in which frequency characteristics of said secondary circuits within said dielectric layer are varied by permittivity changes within said control circuitry so as to function as a frequency variable, voltage-controlled, microwave antenna array, said layer contacting said non-

conducting layer opposite of said dielectric layer;

~~means for activating said matrix circuit~~ a second PVDF-TFE layer enabling a locally deformable structure contacting said layer opposite of said non-conducting layer; and

~~an adjoining layer comprising a plurality of embedded control switches for varying permittivity of said ferrotunable material, whereby function of said matrix circuit is affected~~ a second outer layer composed of an ultra, high-strain polymer contacting said second PVFD-TFE layer opposite of said layer.

Claim 15. (Currently amended) The sheet-wise, bimorph composited structure of claim 14, wherein said secondary circuits are selectively interconnected via ~~MEMS~~ a plurality of switches~~,~~ ~~transistors, thin film transistors, semiconductor devices, photoconductors or optically controlled switches~~ each enabled by a magnetic field, a thermal field, or a vibration.

Claim 16. (Cancelled)

Claim 17. (Cancelled)

Claim 18. (Currently amended) An electromechanical coupler mechanism comprising:

a dielectric material having a first surface and a second surface;

an electrically conducting layer substantially adjacent to said first surface of said dielectric material; and

a plurality of electrically conducting patterns supported by said second surface of said dielectric material, ~~said electromechanical coupler mechanisms~~ one or more said electrically conducting patterns comprising a ~~plurality of~~ regions~~,~~ having a resonant frequency ~~of at least one region being~~ independently adjustable by a switch enabled by a magnetic field, a thermal field, or a

vibration.

Claim 19. (Currently amended) The electromechanical coupler mechanism of claim 18, further comprising means for varying an electric field across at least a portion of said ~~dielectic~~ dielectric material to vary permittivity of said dielectric material.

Claim 20. (Original) The electromechanical coupler mechanism of claim 18, wherein said resonant frequency of said region is adjusted by varying a dielectric constant of a tunable dielectric.

Claim 21. (Currently amended) A reconfigurable antenna comprising:

a substrate;

a plurality of addressable antenna elements disposed within a matrix array upon said substrate, said antenna elements having initial fixed antenna characteristics;

a switch ~~means~~ enabled by a magnetic field, a thermal field, or a vibration for electrically interconnecting at least two of said addressable antenna elements; and

means for activating said switch ~~means~~, wherein a plurality of antenna element settings can be selected to alter said antenna characteristics in a desired fashion.

Claim 22. (Original) The reconfigurable antenna of claim 21, further comprising:

a plurality of individual voltage-controlling switches for applying an electric field in pre-selected regions of said substrate; and

means for switching said voltage-controlled switches to vary permittivity of regions of said substrate thereby varying critical frequency characteristics of said antenna.

Claim 23. (Currently amended) The reconfigurable antenna of claim 22, wherein said means for controlling power flow to said adjustable components of each said voltage-controlled switches is

accomplished by means of gating hard switches disposed in a row-column arrangement.

Claim 24. (Currently amended) The reconfigurable antenna of claim 23, further comprising at least one hard switch controlling electric power delivery to at least one said voltage-controlled switch.

Claim 25. (Currently amended) The reconfigurable antenna of claim 23, wherein said switches control phase relationship between a pair of ~~dielectic~~ dielectric patches.

Claim 26. (Original) The reconfigurable antenna of claim 23, wherein said switches control phase relationship between sub-arrays comprising a plurality of dielectric patches.

Claim 27. (Currently amended) The reconfigurable antenna as in one of claims 23-26, further comprising an input/output interface between said voltage-controlled switches and said hard switches.

Claim 28. (Original) The reconfigurable antenna as in one of claims 23-26, wherein said dielectric material is a voltage controllable ferrotunable laminate residing on an antenna substrate as part of said dielectric material to form an adjustable element of a passive circuit.

Claim 29. (Original) The reconfigurable antenna as in one of claims 23-26, wherein voltage control is implemented by a hard switch matrix charge controller altering voltage so as to optimize array pattern characteristics as a function of selective activation of said hard switches and scan angle parameters.

Claim 30. (Cancelled)

Claim 31. (Cancelled)

Claim 32. (Original) The reconfigurable antenna as in one of claims 23-26, further comprising a

digital controller to apply small signal controls to selected sub-arrays of said hard switches so as to enable an antenna array to effectively comprise independently operating antenna.

Claim 33. (Cancelled)

Claim 34. (Original) The reconfigurable antenna as in one of claims 21-26, wherein a set-point antenna parameter is locally controlled via a voltage control oscillator or a phase lock loop.

Claim 35. (Original) The reconfigurable antenna as in one of claims 21-26, wherein a set-point antenna parameter is locally controlled via a discrete MEMS voltage control oscillator or a phase lock loop.

Claim 36. (Original) The reconfigurable antenna as in one of claims 21-26, wherein a set-point antenna parameter is locally controlled via a substrate compatible microelectronic circuit voltage control oscillator or a phase lock loop.

Claim 37. (Original) The reconfigurable antenna of claim 36, wherein a synthetic impedance power supply is used so as to impedance match a load at each individual and sequentially changing said adaptive circuitry.

Claim 38. (Original) The reconfigurable antenna of claim 37, further comprising a microcontroller circuit having a plurality of programmable microprocessors or digital signal processors, non-volatile RAM, volatile RAM , interface peripherals and clock/timing circuits.

Claim 39. (Original) The reconfigurable antenna of claim 38, wherein said interface peripherals are comprised of a plurality of digital to analog converter circuits.

Claim 40. (Original) The reconfigurable antenna of claim 39, wherein interface peripherals are comprised of a plurality of logic circuits so as to provide control signals to a matrix of row-

column hard switches.

Claim 41. (Original) The reconfigurable antenna of claim 40, wherein said logic circuits are comprised of a plurality of programmable logic devices including GAL, PAL, PLD, CPLD or FPGA.